

- Amend*
- (b) a projection system having a plurality of polarized light modulators, each modulator generating a light-component-specific image associated with one of said light components;
  - (c) a projection lens for projecting an image combined from the light-component-specific images from said modulators; and
  - (d) wherein said light source includes a polarization converter, and wherein said polarization converter has a first dichroic filter and a second filter complimentary to said first dichroic filter, and wherein each dichroic filter is sandwiched between two quarter waveplates.

*sub (c) > 1/2*  
*1/5* The system of claim ~~1, 4~~ <sup>1/1</sup> wherein said polarization converter further includes at least two polarizing beam splitters.

#### REMARKS

The specification has been amended as suggested by the Examiner.

The drawings have already been amended as suggested by the Examiner to include the designation of -Prior Art-.

The Examiner indicated that claims 32-37 are allowable.

The Examiner rejected claims 1-6, 8, 14, 17-20, 23-25, 27, 38, 40-42, 44, and 45 as being anticipated by Kurematsu et al, U.S. Patent No. 5,267,029.

Kurematsu et al. disclose a projector that includes a white light source 13 provided with a high luminance lamp converted into a polarized light whose plan of polarization is uniform by a polarization converting module 12. (Column 3, line 65 to column 4, line 1). Thereafter, the polarized light is separated by the projection system into lights of red, green, and blue colors which are rectilinearly polarized lights and being modified by respective LCD panels. (Column 5, line 2 to line 18). The output of the projection system is projected by a projection lens 1. (Column 5, lines 19-20).

All of the embodiments disclosed by Kurematsu et al. include a white light source 12 producing generally randomly polarized light and a polarization converter 12 that receives the randomly polarized light and provides P-polarized white light  $P_w$  (see FIGS. 1, 5) or S-polarized white light  $S_w$  (see FIGS. 2, 3, 6, 7). In no case does the polarization converter 12 provide polarized light having more than one polarization state. Further, each of the projection systems is designed to receive such uniformly polarized light as the input thereof.

Claim 1 patentably distinguishes over Kurematsu et al. by claiming a polarization converter for use with a light source that generates a light beam having at least two light components, comprising an optics array capable of separating the light beam into at least one light component polarized **differently** than another light component. The output of the polarization converter 12 of Kurematsu et al. provide a light beam where all of the light components are polarized the **same**, namely, either all P polarized or all S polarized.

Claims 2-19, depend from claim 1, either directly or indirectly, and are patentable for the same reasons asserted for claim 1.

Claim 50 patentably distinguishes over Kurematsu et al. by claiming a projection display system using polarized light comprising a polarization converter for use with a light source that provides a light beam having at least two light components where at least one light component is polarized **differently** than another light component. A projection system receives the differently polarized light and provides light-component-specific images. A projection lens projects an image combined from the light-component-specific images.

Claims 51-68 depend from claim 50, either directly or indirectly, and are patentable for the same reasons asserted for claim 50.

The projector of Kurematsu et al. include a polarization converter 12 that receives non-polarized light and transmits polarized light all having the same polarization. The projection system receives this polarized light and transmits only a fraction thereof to the projection lens. A substantial portion of the light is not transmitted from the projection system, in contrast to the polarization converter, because the light is deviated from the optical path (see Column 5, lines 14-22 and lines 35-47).

Claim 20 patentably distinguishes over Kurematsu et al. by claiming a method for converting light that separates a nonpolarized light beam into at least one light component **polarized differently** than another light component, wherein **substantially all** of the light beam is transmitted. The light beam is received and a light-component-specific image is provided and projected through a projection lens.

The polarization converter of Kurematsu et al. does not separate the nonpolarized light into at least two different light components with different polarizations. The projection system

of Kurematsu et al. does in a broad sense separate light but fails to transmit substantially all of the light beam. In other words, the portion of Kurematsu et al. that separate the nonpolarized light beam does not provided differently polarized light, the portion of Kurematsu et al. that separate light does not transmit substantially all of the light beam, and the combination thereof likewise does not provide the differently polarized light components while transmitting substantially all of the light beam.

Claims 21-24, depend from claim 20, either directly or indirectly, and are patentable for the same reasons asserted for claim 20.

Claims 25 and 38 patentably distinguishes over Kurematsu et al. by claiming a light source generating a light beam having at least two light components, wherein the light components are polarized and at least one of the light components is polarized differently than another of the light components.

As previously described, Kurematsu et al. fail to disclose the polarization of the light components where at least one of the light components is polarized differently than another of the light components. In contrast, the polarization converter of Kurematsu et al. teach a light beam with the same polarization, namely,  $P_w$  or  $S_w$ .

Claims 26-37 and 39-49 depend from their respective independent claims, either directly or indirectly, and are patentable for the same reasons asserted for their respectively independent claim.

Claims 69-73 are similar to original claims 20-24 but add limitations regarding a generally white light beam and that substantially all of the generally white light beam is transmitted as a single beam.

Claims 74-80 are similar to original claims 25-31 but add limitations regarding a generally white light beam and that the at least two components are provided to a projection system as a single beam.

Claims 81-85 are similar to original claims 32-36 but simply reverse the polarization states of p and s.

Claims 86-97 are similar to original claims 38-97 but add limitations regarding a generally white light beam and that the at least two components are provided to a projection system as a single beam.

The claims indicated as allowable have been rewritten in independent form as follows:

Claim 7 as new claim 98.

Claim 9 as new claim 99

Claim 10 as new claim 100

Claim 11 as new claim 101

Claim 12 as new claim 102

Claim 13 as new claim 103

Claim 15 as new claim 104

Claim 16 as new claim 105

Claim 21 as new claim 106

Claim 22 as new claim 107

Claim 26 as new claim 108

Claim 28 as new claim 109

Claim 29 as new claim 110

Claim 30 as new claim 111

Claim 31 as new claim 112

Claim 39 as new claim 113

Claim 43 as new claim 114

Claim 46 as new claim 115.

The Examiner is respectfully requested to reconsider the claims, in light of the foregoing amendments and remarks, and to pass claims 1-115 to issue.

Respectfully submitted,




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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to Box Fee Amendment, Assistant Commissioner for Patents, Washington, D.C. 20231.

Dated: 1/30/2001

  
Kevin L. Russell

## APPENDIX

### In the specification:

The modification to paragraph 2, page 19 is as follows:

FIGS. 1-3B depict examples of prior art projection display systems.

The modification to paragraph 8, page 19 is as follows:

FIGS. 9-14B depict examples of prior art polarization converters.

### In the claims:

--20. (Amended once). A method [for converting] of projecting light comprising:

(a) producing a light beam that is nonpolarized and has at least two light components; [and]

(b) separating said light beam into at least one light component polarized differently than another light component, wherein substantially all of said light beam is transmitted[.];

(c) receiving said light beam as a result of step (b) and providing light-component-specific images; and

(d) projecting said light-component-specific images through a projection lens.

-- 32. (Amended Once) A projection display system using polarized light comprising:

(a) a light source for generating a light beam having at least three light components, wherein one of said light components is p-polarized and two of said light components are s-polarized[.] ;

- (b) a projection system having plural polarizing beam splitters and dichroic filters therein, wherein each polarizing beam splitter and dichroic filter reflects one of said light components and transmits another of said light components and LCD panels, each LCD panel generating a light-component-specific image associated with each light component, wherein said polarizing beam splitters and said dichroic filters are arranged in a substantially x-shaped configuration, wherein said dichroic filters are normal to said polarizing beam splitters and arranged to intersect adjacent an edge thereof; and
- (c) a projection lens for projecting an image combined from the light-component-specific images from the LCDs.